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ABSTRACT

A meta-analysis of studies that have explored the effect of financial aid to undergraduates on persistence was undertaken. In addition to identifying such studies, research objectives were: to determine the magnitude of the effect of financial aid on student persistence in each study; and to compare the financial aid effect sizes in relation to various study characteristics. Over 500 studies were reviewed for possible inclusion in the meta-analysis, and 62 studies were selected as appropriate. Persistence was measured in a time dimension (e.g., 1 year, graduation in 4 years). In addition to combining the results of all the studies, the first meta-analysis contained a diverse sample of studies, including research at public and private colleges and studies examining a particular student population. The second meta-analysis compared studies measuring persistence as graduation from college and studies using less time than graduation. The third meta-analysis considered the effect of financial aid on student persistence in two-year and four-year colleges. The fourth meta-analysis considered the effect of controlling for academic ability (i.e., the ability of aid recipients compared to nonrecipients). Findings are considered in detail. (SW)

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THE EFFECT OF FINANCIAL AID ON STUDENT PERSISTENCE

by

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This paper was presented at the Annual Meeting of the Association for the Study of Higher Education held at the San Diego Hilton in San Diego, California, February 14-17, 1987. This paper was reviewed by ASHE and was judged to be of high quality and of interest to others concerned with the research of higher education. It has therefore been selected to be included in the ERIC collection of ASHE conference papers.

The Effect of Financial Aid on Student Persistence

Tullisse A. Murdock
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In 1979 the Aspen Institute Conference on Student Aid Policy identified the need to accumulate and review evidence on whether financial aid programs were actually achieving one of their major purposes--which has been variously labeled as increased retention, successful academic program completion or student persistence. The Institute implied that a strong evaluation of the effectiveness of financial aid programs could not occur without further research and that a general public confidence crisis could transpire since it "appeared" that a relationship might exist between "free rides" and non-performance by aided students.

The Reagan Administration's emphasis on dual federalism, tax reform, and increased defense spending caused real dollar student financial aid cutbacks between 1980-81 and 1983-84. The movement by the federal government to reduce student financial assistance brought further cries from the higher education world for more impact studies to be performed in order to provide a sound research basis for financial aid policy makers. Both Herndon (1982) and Jensen (1983) reiterated the Aspen Institute's concern for evaluation of the effects of financial aid on student outcomes. Herndon suggested that

> legislators might consider allocating a fraction of aid appropriations to systematic research on these interactive factors (financial aid variables) before employing wholesale programmatic cutbacks that greatly limit the attainment of equal educational opportunity (1982, p. 43).

Stampen (1984) argued that, historically, financial aid policy decisions have been a result of political battles and negotiation rather than action based on evaluation and empirical research. Even if decision makers had been inclined to consult research for input, however, "they would have found little help, because the results of the few studies focusing on impacts are mixed" (p. 13).

Stampen's emphases on too few studies and mixed results echo the concerns of most financial aid research reviewers, particularly when the focus of financial aid effect is limited to only one of its major objectives--persistence. Stampen based his judgments on the fact that of the 800 financial aid studies conducted between 1970 and 1978, only one in ten focused on strategies or purposes, environmental factors, or the impacts of student aid. Most studies concentrated on program and structure "to the neglect of legitimate concerns raised by policy makers and the general public about the overall success of student aid in reaching its policy goals" (p. 13). One problem with Stampen's analysis is that he somewhat confined his research review to sponsored and published research. For the period between 1978 and 1984, Stampen made reference to only the four impact studies reported in the 1983 *Handbook of Student Financial Aid*

Jensen's (1983) evaluation of student aid effectiveness involved a review of the empirical literature. Jensen based his conclusions on only eight published studies of the relationship between student aid and persistence. Even within those eight studies, results varied as to the effect of financial aid on persistence. Jensen concluded that a majority of the studies reviewed found student aid to have a small positive effect on student persistence. Hood and Maplethorpe (1980) were heavily dependent on Astin's (1975) study and expanded their review by inclusion of only five other studies. Their review consisted of few conclusions and numerous unanswered questions on the impact of financial aid on student persistence. Wedemeyer's (1972) review of Guaranteed Student Loan and the National Direct Student Loan programs included no undergraduate impact studies and mainly concentrated on studies related to defaults and to the initial introduction of loans into student financial aid policy. Pantages and Creedon (1978) cited seven financial aid studies in their review and concluded that the awarding of scholarships and grants increased student persistence. Herndon's (1982) review of the efficacy of student financial aid cites only four studies in his evaluation of persistence. He

concluded that financial aid, in general, increased a student's chance of persisting in college. Both the Herndon (1982) and Pantages and Creedon (1978) reviews contended that, although not definitive, research indicated that loans did not increase retention rates.

Typical descriptive reviews of the literature shed little light on the relationship between student financial aid and persistence. Too often, the reviewers rely on a small number of nonrepresentative studies from which to draw their conclusions. Descriptive reviews seldom investigate study charactertistics, which may account for the differences in study results. Many more financial aid impact studies have been performed than ordinarily is cited by research reviewers. The review contained herein includes over thirty research studies that investigated the relationship between student aid and persistence alone. Researchers have analyzed the relationship at individual institutions and nationally, through the use of the National Longitudinal Study. The relationship has been examined in regards to student persistence and specific state financial assistance programs, financial aid programs for minority and disadvantaged students, and federal loans, grants, and work-study programs.

Admittedly, from a descriptive standpoint, results of past studies appear mixed. However, the problem does not appear to be the lack of research on the relationship between persistence and financial aid; rather, the problem seems to be the lack of systematic integration of the existing studies so that true relationships can be discerned. Systematic integration would allow for generalizable conclusions, thus providing more reliable guidelines for national, state, and institutional financial aid policy. To date, there have been no meta-analyses and no true integrative reviews conducted on research examining the relationship between student financial aid and persistence.

The purpose of the present research is to perform a meta-analysis of existing empirical studies that have investigated the relationship between student persistence and financial aid.

Meta-analysis is "the statistical analysis of the summary findings of many empirical studies" (Glass et al., 1981, p. 21). The study has three major objectives: (1) to identify and collect all studies that investigated the effect of financial aid on student persistence; (2) to determine the magnitude of the effect of financial aid on student persistence in each study; and, (3) to compare the financial aid effect sizes in relation to various study characteristics.

The meta-analysis addresses the primary research question does financial aid promote student persistence in higher education? More specifically, the study focuses on several questions that have not been addressed in previous research. Is there a difference in the impact of financial aid on persistence at four-year institutions as compared to two-year colleges? Does the impact of financial aid on student persistence vary with the measure of persistence employed, particularly when measurement extends beyond the first year of education? Do studies that control for academic ability exhibit a different effect size than studies that do not control for academic ability? And, finally, can meta-analysis resolve differences in results obtained among researchers examining the relationship between financial aid and persistence?

Framework

Current student financial aid policy has stressed the overall objective of equal higher education opportunity. More specifically, the numerous federal, state, and institutional student financial assistance goals are summarized as follows (Fife, 1975): (1) to provide the financially disadvantaged students with access to some form of postsecondary education; (2) to allow these students some freedom to attend the college of their choice; (3) to provide aid over a period of years to allow students to achieve their educational objectives; (4) to provide a freer flow of students in the educational martketplace; (5) to help preserve the diversity of higher education; (6) to encourage more students to major in certain socially-needed occupations; and

(7) to insure that students of higher artistic, athletic, and academic achievement are able to continue their education. The first three goals--access, choice, and persistence-- have been the driving forces behind the major objective of equal educational opportunity.[1]

In the past, educators have emphasized the importance of access and choice as necessary components for any policy with an objective of equality of educational opportunity. Not only have student financial aid programs been means to that end, they probably have been a somewhat successful means. Not withstanding some data to the contrary (e.g., Hansen, 1983), studies such as the College Student Grant Study (Fife and Leslie, 1976) and the Leslie, Johnson and Carlson study (1977), suggest the positive impact of financial aid on access and choice. Proposed reductions in federal funding of student assistance have led educational leaders, such as Derek C. Bok, to prophesy the loss of equal educational opportunity and the return of elitism in higher education.

> By imposing a limit on the cost of college education which the federal government will support, it sharply limits the choices available to students of modest means. The result will tend to segregate colleges and universities according to social class--the very evil which federal student aid was created to combat (*The Chronicle of Higher Education*, May 1, 1985, p. 22)

How important is persistence in the formula for actualization of equality of educational opportunity? Both Jensen (1983) and Fife (1975) emphasize the significance of persistence. "Equal educational opportunity will be achieved only when students who have entered the institutions of choice are able to continue to the limits of their capabilities and motivation" (Jensen, 1983, p. 299). "In other words, students should have sufficient means to pursue

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[1] Persistence at this point in the discussion refers to the length of time a student desires to invest in the attainment of an educational objective. That time investment differs among students depending upon whether the objective is a one year certificate, two- or four-year degree, or an advanced degree.

their education . . . If this does not occur, then the aid program falls short of full equal educational opportunity" (Fife, 1975, p. 8).

Today, the major goal of student financial aid is equal educational opportunity. Equal educational opportunity exists when economic barriers are removed, and individuals have the opportunity of access, choice, and persistence in higher education. Whether student financial aid has actually accomplished its perceived objectives is a question still open to debate. However, the criteria for evaluating the effect of financial aid on persistence is outlined by Stampen and Cabrera (1986).

> If laws and regulations governing student aid limit the distribution of aid to economically disadvantaged students and if the only difference between aided and non-aided students is the availability of financial resources to pay college attendance costs, then aid would reduce financial reasons for dropping out of college if it fills the resource gap between aided and non-aided students. Thus, if the two assumptions are accurate, the attrition rate of aided students would be expected to be neither higher nor lower but the same as those of non-aided students.

Therefore, if we operate under Stampen and Cabrera's (1986) assumptions, the financial aid objective of persistence in the formula for equal educational opportunity would be met if the retention rates of aided and non-aided students were approximately the same.

Definition of Persistence and Financial Aid

Financial aid persistence studies incorporate a wide variety of persistence time frames: continuous enrollment for one or two semesters (quarters), completion of one academic year and enrollment in the following term, graduation with a degree or certificate, graduation and/or four years of enrollment, and continous or noncontinous enrollment for more then four years and/or graduation. Retention is often used as a synonym of persistence, as is "survival." Some literature, however, defines retention as a concerted effort made on the part of the institution to prevent students from dropping out or withdrawing.

Financial aid are those funds provided by higher education institutions, state governments, and the federal government to assist students in defraying the costs of higher education. There are three basic categories of financial aid provided to students: grants, loans, and work.

METHODS

The Search Process

The search for studies began with an Educational Resources Information Center (ERIC) probe, which yielded over three hundred studies and articles related to financial aid and persistence. Since a computer search is limited by its use of specific descriptors, a manual search of the *Current Index to Journals in Education , Sociological Abstracts, Educational Index, Social Sciences Index,* and *Psychological Abstracts* was conducted. A "tracking" process entailed checking the bibliography of each study and the bibliographies of previous financial aid and persistence research reviews.

A search of the *Dissertation Abstracts* revealed over seventy potential studies on financial aid and persistence. Dissertation bibliographies proved to be a primary source for location of other prospective studies.

An attempt was made to access as many information sources as possible in order to ensure a representative sample of the population. The initital investigation was unrestricted; no parameters were established regarding the year of the study or the type of financial aid under consideration in the study. In total, over five hundred studies were reviewed for possible inclusion in the meta-analysis and, orginally, sixty-two studies were deemed appropriate for use.

Selection of Studies

The original sixty-two studies included in the sample were those studies that measured persistence in some temporal way (e.g., one semester, one year, graduation in four years). Academic achievement studies and studies measuring persistence in terms of credit hour accumulation were excluded. Autopsy studies also were excluded from the sample since student perceptions of the importance of aid were deemed less valid than actual persistence measures. The equal educational opportunity framework placed additional restrictions on the sample selection. Studies that examined graduate students, foreign students, and athletic scholarship students were excluded from the sample.

Studies using the "one-shot case study" design (Campbell and Stanley, 1963) were eliminated from the sample since no comparisons were made with nonrecipients. Studies were excluded when the measurements of the dependent variable (persistence) or the independent variable (financial aid) were unclear or ambiguous. Also, studies were eliminated that did not provide adequate descriptive or inferential statistics so as to compute an effect size. Eventually, the meta-analysis sample was reduced from the original sixty-two studies to thirty-one studies as the screening procedure progressed towards greater refinement and uniformity. The final sample includes studies from eight journal articles, twelve dissertations, one practicum, seven unpublished reports, and three other dissertations later published in journal article form (see Appendix).

In some studies, financial aid was the only independent variable, while in other studies financial aid was one of many independent variables investigated by the researcher. However, to be included in the sample, studies did not necessarily have to analyze statistically the relationship between persistence and financial aid. Often persistence studies reported the number of dropouts and persisters who received financial aid merely as background

information. In many studies, the difference in persistence rates between financial aid recipients and nonrecipients was reported in descriptive terms. A persistence or attrition study was incorporated into the sample so long as it provided data that could be converted into the common metric utilized in the meta-analysis.

In selecting studies for a meta-analysis, the question arises regarding the quality of the studies incorporated in the sample. In other words, should poorly designed studies be discarded? Both Glass et al. (1981) and Wolf (1986) emphasize that a major strength of a meta-analytic review is its a posteriori judgement of study quality. "Meta-analysis does not a priori prejudge and exclude studies as unworthy because of their particular research design, however weak" (Wolf, 1986, p. 54-55). In the same context, Jackson (1980) stresses that more than just study design can threaten internal or external validity, which can be trivial in some cases and consequential in others. "Respect for parsimony and good sense demands an acceptance of the notion that imperfect studies can converge on a true conclusion" (Glass et al., 1981, p. 222).

Glass et al. (1981) have found that the differences in size of average experimental effects between high-validity and low-validity experiments are surprisingly small--no more than 0.1 standard deviation difference. If there are incongruencies in the study results, a modest number of "good" studies in the sample will allow the reviewer to assess whether varying methodological weaknesses may have effected the findings. This a posteriori approach makes meta-analysis much more objective and valuable than most traditional literature reviews. Heterogeneity of study results, methods, and statistical approaches lends depth to the analysis and provides the opportunity to identify trends, mediating relationships, gaps in the literature, and new directions for research (Wolf, 1986).

The Data Coding System

The first step in organizing data for an integrative review is designing a matrix that represents the characteristics of the studies included in the sample. The matrix is not only a beneficial tool for the researcher but a means by which the reader can determine how the reviewer synthesized the studies.

As each study was screened, it was assigned a number and the study characteristics were placed in the matrix. The matrix was designed to reveal potential subgrouping of the studies, the treatment of variables that past literature reviews had highlighted as possible reasons for differences in study results, and the primary data needed for the meta-analyses. Thirteen study characteristics were selected for the representative matrix:

1. Coding: Each study was coded by use of four numbers. The first two numbers of the sequence merely identified the study. The last two numbers in the coding sequence represented independent populations derived from the same study. Some studies investigated the persistence rate of more than one sample of students in an institution. For instance, for comparative reasons, a study may have looked at entering freshmen classes over a period of years. Since each class constituted a different population, it was decided to utilize and treat each class as an independent study. For example, if a study analyzed the persistence rate of the 1967, 1968 and 1969 entering freshman classes at a university, the study would be coded 01 11 for the 1967 freshman class, 01 12 for the 1968 freshman class and 01 13 for the 1969 freshman class.

2. Author and Publication Year: The name of the author and the year the study was published.

3. Publication Source: Publication sources were classified as journal articles (J), reports (R), books (B), dissertations (D), practicums (P), and dissertations that were later published as journal articles (D/J).

4. Type of Statistics: The type of statistics employed by the researcher in the study.

5. Population: The name of the institution from which the study sample was selected or the population studied (e. g. National Merit Scholars).

6. Year of Data: The year(s) that the study was conducted.

7. Persistence Specification: The length of time used in the measurement of persistence. If the study defined persistence as completion of a specific term, the length of time was so recorded (i.e. 1 year, 2 years). If the study defined persistence as one or two academic years with enrollment in the following term, a plus sign indicated the reenrollment requirement (i. e. 1+ year, 2+ years). When persistence was defined as graduation, the number of years the study allowed for degree completion was recorded (i. e. G-4 years, G-6 years). When studies measured persistence by graduation or continued enrollment, the length of time the study covered was recorded as G/E-4 years or G/E-8 years.

8. Type of Financial Aid: The types of financial aid investigated by the researcher were recorded by use of acronyms (e. g. Equal Opportunity Grant was recorded as EOG). Studies that combined all sources of financial aid were recorded by the abbreviation FA.

9. Degree of Control: The degree of control referred to the manner in which control and experimental groups were selected. Three classifications were established: matched, random, and none. "Matched" indicated that the researcher matched a financial aid group with a nonfinancial aid group on certain variables such as age, sex, HSGPA, HSR, and intelligence scores. "Random" indicated that a study's comparative groups were chosen through random selection. "None" indicated that the researcher used no systematic method in choosing the two groups. In this type of study, researchers usually compared a group of financial aid recipients to nonfinancial aid recipients in the same class or to the university population as a whole. The "degree of control" category did not necessarily reflect the rigor of the study itself, but was merely a data classification for purposes of the meta-analysis.

10. Treatment of Transfers (T) and Stopouts (SO): A notation on the treatment of transfer and stopout students was deemed important since studies treating them as dropouts may show different persistence rates than studies treating them as persisters. As an example of recording methods, a study designating transfers as dropouts and stopouts as persisters was recorded as T = DO and SO = P. Some studies excluded stopout or transfer students from the sample and were recorded SO = NI or T = NI for not included in sample.

11. Enrollment Status: The enrollment status of a study's popoulation was recorded as FT (full-time students only) or FT/PT (full- and part-time students). Studies that did not indicate enrollment status were recorded as NR (not reported).

12. N: The sample number in each study.

13. Special Notes: Special notes were of study characteristics that were considered important. Notations were commonly made for unusual study populations such as older students, two-year college transfer students, minority students, or private institution students.

Statistical Procedures

In order to aggregate studies statistically, the findings of each study must be transformed into some common metric. Statistical methods for composing metrics range from various counting procedures to a variety of probability level summations and combined raw or weighted test statistics such a *t*- test and *z*- test (Wolf, 1986; Rosenthal, 1978).

One of the more powerful meta-analytic approaches is the effect size. The effect size expresses the magnitude of group differences in the various studies on a common scale. The effect size statistic has been defined by Glass (1977) as

$$d = \frac{\bar{X}_t - \bar{X}_c}{SD_c} \qquad [1]$$

where the effect size (d) is equal to the treatment group mean ($\bar{X}_t$) minus the control group mean ($\bar{X}_c$) divided by the control group standard deviation (SD_c). In relation to this meta-analysis, the treatment group would be financial aid recipients and the control group would be nonfinancial aid students.

One of the advantages of the effect size is that it provides an interpretable estimate of the size of an effect, as well as the effect's significance. For meta-analysts, the major advantage of the effect-size approach is the ability to combine studies that use a broad range of statistical techniques. The reviewer is not restricted to a sample where all studies have employed the same design and statistical treatment. Thus, for example, studies reporting frequency distributions can be combined with studies reporting multiple regression coefficients.

When the group means and standard deviations are not provided, an estimate of the effect size can be obtained by algebraic manipulation of available summary statistics. A *t*, *r*, or chi-square statistic can be converted into effect size by use of various algorithms. In the case of

descriptive statistics, a *phi coefficient* can be used to correlate two variables that are true dichotomies. The computed r can then be converted to an effect size.

Because the sample for this meta-analysis contained studies of quite diverse design and statistical treatment, the estimate of effect size was deemed to be the most appropriate common metric for meta-analytic purposes. The conversion of study data into effect size was dependent upon the statistics used and reported in each study. For interpretative purposes, effect sizes showing a positive value were associated with results favoring the experimental (i.e. financial aid) group, while negative values were associated with results favoring the control (i.e. nonfinancial aid) group. Once the effect size was calculated for each study, the average effect size (d) was calculated for each meta-analysis (Wolf, 1986).

There is some controversy whether all studies in a meta-analysis should be given equal weight. Some studies may be based on a small number of subjects or an unrepresentative sample, while others may contain a large number of subjects under a control group design. When studies are unweighted, it is possible for small sample studies that obtain results inconsistent with most other studies to exert a stronger influence on the results. Wolf (1986) recommends that both the weighted and unweighted effects sizes in a meta-analysis be calculated and reported.

After the unweighted effect sizes were calculated and averaged, effect sizes were weighted and averaged to obtain a mean weighted effect size as suggested by D. L. Sabers (personal communication, June 24, 1986). This method was applied in a meta-analysis of teacher questioning behavior by Redfield and Rousseau (1981). Each effect size was weighted by the ratio of $\frac{n_i}{N}$ where n_i equals the sample of the treatment group and N equals the total number of studies. Thus, the weighting emphasis is on the size of the treatment group and not the size of the total sample. Formula 2 was used to obtain the weighted average effect size ($\bar{Wd}$).

$$W\bar{d} = \frac{(n_i - 1)\, d_i}{N - K} \qquad [2]$$

where n_i equals the number in the treatment group in each study, d_i equals the unweighted effect size in each study, N equals the total number of all treatment groups, and K equals the number of effect sizes.

The average effect sizes were tested for significance using procedures by Hedges (1981). The level of significance (alpha level) was set at .05 ($z = 1.96$).

Analyses

The study includes four meta-analyses examining the effect of financial aid on persistence in relation to: (1) the total sample, (2) different measurements of persistence, (3) two-and four-year institutions, and (4) the degree of study control. The findings for each research question are given in average unweighted and weighted effect sizes. All effect sizes are weighted by the size of experimental group population. Table 1 displays the total number of effect sizes, the total number in the control group, the total number in the experimental group, the average unweighted effect size, the average weighted effect size for each meta-analysis, and the level of statistical significance. Studies investigating and measuring the persistence of more than one population may be represented more than once in a meta-analysis; however, no more than one effect size per population is included in any single meta-analysis.

Effect sizes are analyzed from the standpoint of both unweighted and weighted average effect sizes. Effect sizes are interpreted through use of Cohen's (1977) general guidelines for interpreting effect sizes of studies measuring differences between group proportions. His estimated "regions" of effect size are .20, a "small effect;" .50, a "medium effect;" and .80, a

"large effect." In addition, effect sizes are interpreted through graphic representation by juxtaposing the distribution of the control and experimental groups.

Table 1: Number of Effect Sizes, Total Number in Control and Experimental Groups, Unweighted Effect Sizes, Weighted Effect Sizes and Statistical Significance for each Meta-analysis

COMPARISON	NUMBER OF EFFECT SIZES	TOTAL CONTROL GROUP	TOTAL EXPERIMENTAL GROUP	AVERAGE UNWEIGHTED EFFECT SIZE	AVERAGE WEIGHTED EFFECT SIZE
Meta-analysis I: The Overall Effect of Financial Aid on Persistence					
(All Studies)	46	42,107	29,591	+.1316***	+.0634***
Meta-analysis II: The Effect of Financial Aid on Persistence When the Measurement of Persistence Varies					
(Less than graduation)	36	38,735	24,882	+.1099***	+.0547**
(Graduation in 2 or 4 years)	25	8,611	8,756	+.1469***	+.1507***
(Graduation in 5+ years)	10	4,932	3,174	+.2174***	+.2880***
Meta-analysis III: The Effect of Financial Aid on Persistence of Students in Two-and Four-Year Institutions					
(Four-year/less than graduation)	28	17,226	14,258	+.0861***	+.1055***
(Two-year/less than graduation)	6	14,970	2,012	+.2213***	+.1892***
(Four-year/graduation)	15	5,288	6,310	+.1009**	+.0686*
(Two-year/graduation)	9	623	698	+.1921**	+.2527**
Meta-analysis IV: The Effect of Financial Aid on Persistence of Students when Academic Ability is Controlled					
(All Studies)	14	2,583	2,583	-.0059	-.0381

*p < .05, **p < .01, ***p < .001

RESULTS

Meta-analysis I: The Overall Effect of Financial Aid on Persistence

The first meta-analysis combines the results of all studies examining the relationship between financial aid and student persistence. The meta-analysis serves the purpose of a quantitative review of the literature and provides a generalizable estimate of the effect of

financial aid. The meta-analysis addresses the research question does financial aid promote student persistence in higher education? Table 1 shows forty-six effect sizes, representing forty-six different samples, from thirty-one studies compering the persistence of financial aid recipients to nonrecipients. The majority of studies measured persistence in a timeframe of two years or less. In order to establish some uniformity, for studies that analyzed samples at various stages of persistence (i.e., persistence at 1+year, graduation in four years, graduation in five or more years), the lowest persistence time period measured was selected for representation in Meta-analysis I.

The average unweighted effect size for the populations represented in Meta-analysis I is +.1316 and the average weighted effect size is +.0634. Both effect sizes show a positive value, which is associated with results favoring the "experimental" or financial aid recipient group. Both average effect sizes are significant at the .001 level. Cohen's (1977) guidelines for interpreting effect sizes would place both effect sizes in the category of less then a "small effect." There is considerable dispersion of effect sizes around the overall mean of +.13: thirteen samples show negative results ranging from -.15 to -.02; six studies show positive effect sizes ranging from +.44 to +.50; and, only one study shows a large effect, +.91.

Figure 1 is a graphical representation of the effect on the degree of overlap between the control (nonfinancial aid) and experimental (financial aid) groups. The area under the normal curve associated with the average unweighted effect size of +.1316 is .5517. This means that the average person receiving financial aid would have a persistence likelihood greater than 55.2 percent of the nonfinancial aid group. Thus, financial aid could be expected to move the typical person from the 50th to the 55.2 percentile of persistence for the nonfinancial aid population.

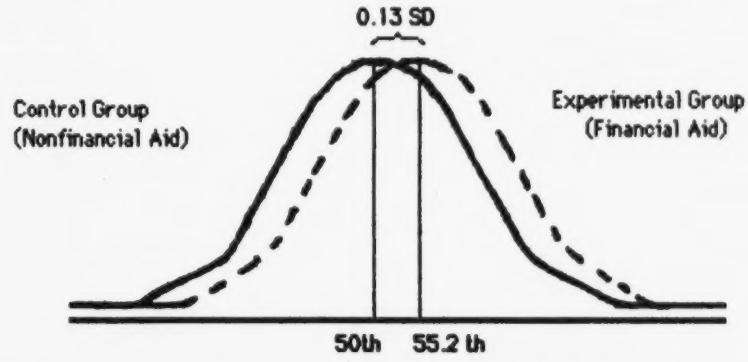

FIGURE 1: Distributions Comparing the Persistence of Financial Aid Recipients to Nonrecipients, All Studies

Note: Average Unweighted Effect Size in Standard Deviation Units (SD)

The area under the normal curve associated with the average weighted effect size of +.0634 is .5239, which means that the average person receiving financial aid would have a persistence likelihood greater than 52.4 percent of the nonfinancial aid group.

The results of the first meta-analysis indicate that financial aid promotes student persistence in higher education, although the effect of financial aid would be classified as "less than small" under Cohen's (1977) guidelines. However, the meta-analytic approach demands and permits further investigation of an effect before final judgement is made.

Meta-analysis I contains a diverse sample of studies: (1) studies examining students at public and private institutions and two- and four-year institutions; (2) studies examining a particular student population such as junior college transfer students, males, females, or minorities; (3) studies that controlled for academic ability, utilized random sampling methodology, or merely compared the persistence of financial aid recipients to the student population as a whole; (4) studies that measured persistence over a period of one, two, four, or eight years; (5) studies examining students enrolled in higher education as early as 1947 and as recent as 1982; (6) studies containing a student sample as large as 14,604 and as small as 90;

and, (7) studies that examined the persistence of students receiving grants, EOG, BEOG, or financial aid in general.

The value of the meta-analytic approach is the ability to utilize study heterogeneity as a means to identify trends and mediating relationships. It is essential to search systematically and to identify whether certain study characteristics influence the magnitude and direction of the effect size. Thus, the next three meta-analyses examine particular study characteristics, not only as a means of answering specific research questions but as a means of providing a more exact evaluation of the effect of financial aid on persistence.

Meta-analysis II: The Effect of Financial Aid on Persistence When the Measurement of Persistance Varies

The second meta-analysis addresses the question does the impact of financial aid on student persistence vary with the measure of persistence employed, particularly when measurement extends beyond the first year of education? Studies measuring persistence in "less than graduation" requirements are compared to studies establishing graduation as the persistence criteria. Twenty-seven studies, involving thirty-six different populations (effect sizes), measured persistence in three or less years. The majority of the studies measured persistence in terms of one and one-half years or less. Only six of the twenty-seven studies used a persistence measurement of two or three years.

Table 1 shows an average unweighted effect size of +.1099 and an average weighted effect size of +.0547 for "less than graduation" studies. Both effect sizes reflect a positive value favoring the financial aid group and both effect sizes could be considered to exhibit a less than "small effect." Both effect sizes are smaller than those of Meta-analysis I. The z-values of both effect sizes are significant at the .01 level. The areas under the normal curve associated with the average unweighted effect size and weighted effect size are .5438 and .5239,

respectively. Therefore, the average person receiving financial aid would have a persistence likelihood greater than 54.4 percent of the nonfinancial aid group.

Seventeen studies, representing twenty-five different populations, measured persistence by graduation in either two- or four-year institutions. An average unweighted effect size of +.1469 and an average weighted effect size of +.1507 are shown on Table 1. The z-values of both effect sizes are significant at the .001 level. The area under the normal curve associated with both average unweighted and weighted effect sizes is .5596. Thus, the average person receiving financial aid would have a graduation probability greater than fifty-six percent of the nonfinancial aid group.

Although all effect sizes, unweighted and weighted, could be classified as having a less than a "small effect," it does appear that studies measuring persistence in terms of graduation show a slightly larger average effect size than studies using a shorter persistence specification of one and one-half years or less. Note the increase in average unweighted effect size from +.1099 for "less than graduation" studies to +.1469 for graduation studies and the increase in percentile from 54.4 percent to 56.0 percent.

In order to discern whether there is an overall tendency for studies of greater persistence length to show larger effect sizes, studies were grouped into persistence periods of one year or less, one and one-half years, and two or three years, graduation in four years, and graduation in five or more years. For nongraduates, the six effect sizes measuring persistence in one year or less show an average unweighted effect size of +.0949; the twenty-three effect sizes measuring persistence for one and one-half years show an average unweighted effect size of +.1122; and the seven effect sizes measuring persistence for two to three years show an average unweighted effect size of +.1404. A small increase in average effect size does occur as the persistence time measured lengthens.

Nineteen studies measured graduation in terms of two or four years. These studies show an average unweighted effect size of +.0963. Eight studies, involving ten different populations, measured persistence in graduation or enrollment over five or more years. An additional meta-analysis was performed on the eight studies to determine average effect size and statistical significance. The average unweighted effect size is +.2174 and the average weighted effect size is +.2889. The z-values for both average effect sizes are significant at the .001 level. Thus, the length of persistence measured seems to have a mediating effect upon the magnitude of the effect size; the longer the persistence period measured the larger the effect of financial aid on persistence, particularly persistence towards a degree. Financial aid appears to exert a stronger effect on a student's decision to remain in college during the latter years of education than during the freshman year.

Meta-Analysis III: The Effect of Financial Aid on Student Persistence in Two- and Four-Year Institutions

The third meta-analysis addresses the question is there a difference in the impact of financial aid on student persistence at four-year institutions as compared to two-year institutions? In approaching this meta-analysis, studies utilized in Meta-analysis I and Meta-analysis II were classified by the type of institution--two-year versus four-year--and the length of persistence measured--graduation versus less than graduation. Table 1 shows that twenty-eight effect sizes derived from twenty, four-year institution studies measured persistence as less than graduation. For four-year students, the average unweighted effect size is +.0861 and the weighted effect size is +.1055. The z-value of both average effect sizes are significant at the .001 level.

Six two-year college studies measured persistence in less than graduation specification. For two-year students, the average unweighted effect size is +.2213, and the average weighted effect

size is +.1892. Both average effect sizes are significant at the .001 level. The unweighted average effect size of financial aid on the length of persistence appears to be almost three times as great for two-year students then for four-year students and almost twice as great for the weighted effect size.

Fifteen effect sizes obtained from twelve studies examined the graduation of financial aid recipients and nonrecipients at four-year institutions. The average unweighted effect size is +.1009 and the average weighted effect size is +.0686. The z-value of the unweighted average effect size is significant at the .01 level, and the z-value of the weighted average effect size is significant at the .05 level.

Nine effect sizes were obtained from four studies on the graduation of financial aid and nonfinancial aid two-year college students. The average unweighted effect size is +.1921 and the weighted effect size is +.2527. The z-value of both average effect sizes are significant at the .01 level.

Two observations are notable as a result of the comparison between two- and four-year institutions. Financial aid appears to have a greater impact on the persistence of two-year college students than four-year college students, although the effect would be classified as a small effect. The average four-year student receiving financial aid would have a persistence likelihood greater than 53.6 percent of the nonfinancial aid four-year group while the average two-year student receiving financial aid would have a persistence likelihood greater then 58.7 percent of the nonfinancial aid two-year group.

The difference in percentage of effect is slightly smaller for studies examining graduation. The average two-year student receiving financial aid would have a graduation likelihood greater than 57.5 percent of the two-year nonrecipient group while the average four-year student

receiving financial aid would have a graduation likelihood greater than 54.0 percent of the four-year nonrecipient group.

A second observation is that, once again, a small increase occurs in the average unweighted effect size in four-year institutions when the persistence measured increases from less than graduation to graduation. The average unweighted effect size increases from +.0861 to +.1009. However, that pattern of increase does not occur with the four-year institution weighted average effect size. The average weighted effect size decreases from +.1055 for studies measuring less than graduation persistence to +.0686 for studies measuring graduation persistence. One plausible explanation for the opposing directions that the weighted effect size takes in Meta-analysis III compared to Meta-analysis II is the exclusion from Meta-analysis III of three studies having a combined population of 19,599 (Karmas, 1974; Terkla, 1985; and Astin, 1979). These three studies measured the combined persistence of two-and four-year students. Since the studies did not differeniate between the student persistence for the two types of institutions, they are not included in Meta-analysis III. However, it is probable that the majority of the student populations represented in each of the three studies were four-year students. When these three studies are included as part of the Meta-analysis III four-year sample, an increase in the weighted effect size does occur. The average weighted effect size for studies specifying persistence as less than graduation is +.0428 and the average weighted effect size for studies specifying graduation is +.1104.

There is a decrease in average unweighted effect size in two-year institutions when studies measuring persistence in less than graduation criteria (effect size = +.2213) are compared to studies measuring persistence in terms of graduation (effect size = +.1021). The decrease indicates that financial aid does not have as great an effect on two-year student graduation probability as it does on four-year students. When studies are weighted, however, the average

effect size does show an increase from +.1892 for studies measuring "less than graduation" persistence to +.2527 for studies measuring graduation.

Meta-Analysis IV: The Effect of Financial Aid on Student Persistence in Relation to the Degree of Study Control

A question often arising in a meta-analysis is to what degree does the amount of control in a study impact the effect size? In this meta-analysis, a researcher would naturally question whether studies controlling for academic ability exhibited a different effect size than studies that did not control for academic ability. In short, are aid recipients as able as nonrecipients?

Exploration of this area is essential for answering the primary question: does financial aid promote student persistence in higher education and, thus, achieve a major goal of federal and many state student financial aid programs? Today, the major goal of student financial aid is equal educational opportunity. Equal educational opportunity exists when economic barriers are removed and individuals have the opportunity of access, choice, and persistence in higher education. By controlling for academic ability, the effect of financial aid on persistence can be better tested in terms of equal educational opportunity.

Seven studies, representing fourteen effect sizes, controlled for academic ability through matching. Table 1 shows the average unweighted effect size of the seven studies is -.0059 and the average weighted effect size is -.0381. The negative values of the effect sizes indicate that financial aid students, when academic ability is controlled, persisted less than nonrecipients. The negative effects, however, are extremely small and approaching a zero effect. Neither average effect size is significant at the .05 level. When financial aid recipients are matched with nonrecipients of equal ability, they appear to persist at almost the same level.

Other Mediating Effects

In a meta-analysis, it is important to examine whether other variables are mediators of the effect or treatment. Control for academic ability, the length of persistence measured and the type of institution examined--two-year or four-year--already have been shown to influence the magnitude of average effect sizes.

The matrix representing study characteristics was designed to highlight other potential mediating variables. The findings of past persistence literature indicated the possibility of four other mediating effects: whether the student population attended a public or private institution, whether the student population included transfers and stopouts as persisters, whether part-time students were included in the study population, and the year that the persistence was measured.

Five studies examined student persistence in private colleges. The total population of the studies is 2,265 with an average unweighted effect size of +.2106 and an average weighted effect size of +.2744. Both average effect sizes are larger than the total sample average effect sizes of +.1316 and +.0634 (Meta-analysis I). All five studies measured persistence in a timeframe of two or less years and treated transfers and stopouts as dropouts. Two other studies examining private college persistence support the meta-analysis results: Shedden (1976) and Flynn (1980), showed a relatively high persistence for their financial aid students over a two and one-half year period, 68.8 percent and 49.7 percent, respectively. Therefore, it appears that financial aid shows a stronger effect on student persistence at private institutions than public institutions.

In order to determine if a difference in average effect size occurs among studies that differ in their treatment of transfers and stopouts, studies that compared the persistence of financial aid recipients to nonrecipients were organized into four groups: studies that treat both transfers and stopouts as persisters, studies that treat transfers as persisters and stopouts as

dropouts, studies that treat transfers as dropouts and stopouts as persisters, and studies that treated transfers and stopouts as dropouts. Five studies, involving six populations, treated transfers and stopouts as persisters. The average unweighted effect size for these five studies is +.2729 and the average weighted effect size is +.0564. Only one study, exhibiting an average effect size of +.2828, treated transfers as persisters and stopouts as dropouts. Six studies, representing eight populations, treated transfers as dropouts and stopouts as persisters. The average effect size of these six studies is +.2393 and the average unweighted effect size is +.2256. The average unweighted effect size for the remaining nineteen studies that treated transfers and stopouts as dropouts is +.1245 and the average weighted effect size is +.0606.

The average unweighted effect size of studies that treated either transfers and stopouts as persisters is larger in all cases than the studies that treated both as dropouts. When the three groups of studies that treated either transfers and stopouts as persisters are combined, the average weighted effect is also larger than the group of studies treating both as dropouts. These findings lend evidence to hypothesize that the difference in definitions may be a potential mediator. Studies that treat either transfers or stopouts as persisters show financial aid to have a larger effect on persistence than studies that treat both groups as dropouts.

In order to determine whether student enrollment status could be a mediator on effect size, studies that included part-time students in their populations were examined. Five studies, representing eleven populations, included part-time students in their sample. The average unweighted effect size for these studies is +.0788 and the average weighted effect size is -.0408. Meta-analysis I shows an average unweighted effect size for the total sample of +.1316 and an average weighted effect size of +.0634. The average effect size of studies examining full-time student persistence is almost twice as great as the average effect size of

studies that included part-time students in their population. The difference in effect sizes of the two groups is ample to indicate that enrollment status is a potential mediator of effect size.

The year of the study data was examined to determine the potential of a mediating effect. Stephenson and Eisele (1983) investigated the graduation of women students receiving financial aid prior to 1972 and after 1972. They hypothesized that the 1972 financial aid amendments would allow more women to be eligible for financial aid and, thus, increase women graduation probability. The study found that women in the 1972 class did graduate at a slightly higher rate than the pre-1972 class of women, but the difference was not statistically significant. Since the 1972 amendments were not operationally in full force until approximately 1975, Stephenson and Eisele concluded that the amendments had not had time to impact the 1972 population heavily. They predicted that future studies with later data would find a change in the financial aid impact on higher education persistence.

As a result of Stepheson's and Eisele's hypothesis, studies that measured the persistence of student populations prior to 1975 were compared to studies that examined student populations after 1975. Eleven studies, representing fourteen samples, investigated the persistence of financial aid recipients to nonrecipients enrolled in institutions since 1975. The average unweighted effect size of the later studies is +.1965 and the average weighted effect size is +.0187. The average effect size of the twenty-three studies performed on student populations enrolled prior to 1975 is +.1032 and the average weighted effect size is +.0996. Studies conducted after 1975 show a slightly higher average unweighted effect size than studies performed prior to 1975. But, the average weighted effect size is smaller for the more recent studies than for the earlier studies. An explanation for the difference in weighted average effect sizes might be found in the Astin and Cross study (1979). Astin and Cross were surprised to find that their 1975 study did not find financial aid variables to be more significant predictors

of persistence than they had hypothesized; earlier studies had shown financial aid as an important factor in predicting persistence. They interpreted their finding to be a result of financial aid programs reaching a larger number of the students who needed aid, thereby reducing the amount of variability in the sample.

CONCLUSIONS

The meta-analysis sample included studies conducted on the student populations of particular public and private institutions as well as national longitudinal surveys. In addition, the geographical regions represented by the studies are numerous and span the entire United States. Therefore, the conclusions based on the meta-analysis probably have considerable generalizability. Through systematic examination of study characteristics, the meta-analysis also reveals plausible explanations for differences in study results and provides guidance for future research. Based on the results of the meta-analysis, the following conclusions were reached.

1. ***Financial aid does promote student persistence and, thus achieves, at least to some degree, a major goal of federal and many state student financial aid programs.***

Meta-analysis I found financial aid to have a "less than small" but significant positive effect on student persistence. If we operate under Stampen and Cabrera's (1986) hypothesis that financial aid is directed towards the economically disadvantaged student, that the only difference between recipients and nonrecipients is availability of financial resources, and that aid reduces financial reasons for dropping out of college by filling the resource gap, then the persistence behavior of the recipients and nonrecipients should be approximately the same. In fact, studies controlling for academic ability (Meta-analysis IV) show virtually no difference in the persistence of recipients and nonrecipients.

A less than small or near zero financial aid effect size, however, cannot be interpreted in the traditional sense of a treatment having "no effect." The purpose of financial aid is to remove economic barriers in order for economically disadvantaged students to enter and remain in the higher education institutions of their choice. A near zero financial aid effect size indicates that the "treatment" does have an impact--lower SES students are persisting at the same level as middle and upper SES students.

The meta-analyses results are supported by studies that did not lend themselves to conversion into an effect size: Moon (1930), Jex and Merril (1962), Rhodes and Caple (1969), and Astin (1975) found financial aid students persisted longer than nonrecipients. Bergen et al. (1970) examined the persistence of freshmen receiving need-based scholarships at Kansas State University. They matched the scholarship students with nonscholarship students on the basis of sex, ACT scores, and high school grade point averages. Bergen et al. found no significant difference in persistence of the two groups, although more scholarship recipients completed four years of study.

Roberts (1979) examined the persistence of financial aid recipients admitted to Michigan State University under the Developmental Program. The program was designed to assist academically and economically disadvantaged students who might not otherwise have had an opportunity for a university education. Interestingly, eighty percent of the financial aid students in the Developmental Program enrolled for the second year compared to eighty-two percent of the total freshman population--a difference of two percent. Robert's study provides an excellent example of equal educational opportunity in action when financial aid is combined with compensatory educational programs to assist economically and academically disadvantaged students.

2. ***Financial aid has a stronger effect on the persistence of two-year students than four-year students. Whether financial aid exerts a stronger influence towards graduation in a two-year college, as it does in a four-year institution, is not conclusive.***

Although classified as a small effect, the unweighted effect size of financial aid on the length of persistence was found to be almost three times as great for students of two-year colleges than students of four-year institutions. One factor that may account for this finding is the larger proportion of minority and low SES students attending two-year colleges.

A report by the College Board (1985) on two-year college student persistence revealed that black financial aid recipients persisted at a 23.6 percent higher rate than black nonrecipients, white recipients persisted at a 15.1 percent higher rate than white nonrecipients, the effect of financial aid on student persistence was greater for low SES students than for middle and high SES students, and low SES students persisted at the same rate as the other two socioeconomic groups. In addition, a 1982 study (National Center for Education Statistics, 1984) on two-year college student persistence, reported that all minority groups persisted longer than whites. In comparison, financial aid was found to have a slightly smaller effect on four-year institution black students, low SES students persisted at a lower rate than middle and high SES students, and whites persisted at a higher rate than blacks and Hispanics. Since two-year colleges enroll a larger percentage of minority and low SES students than four-year institutions and since financial aid appears to have a greater impact on those two populations, it seems reasonable that the effect size would be greater for two-year colleges than four-year institutions.

The meta-analysis showed a decrease in average unweighted effect size in two-year institutions when studies measuring persistence employed the "less than graduation criterion" (effect size = +.2213) were compared to studies measuring persistence in terms of graduation (effect size = +.1021). The meta-analysis on four-year institutions showed the opposite

results--financial aid effect sizes were larger for studies measuring graduation than studies using "less than graduation" persistence specifications. The most plausible explanation for this decrease is the large number of non-degree and non-certificate seeking students enrolled in two-year colleges. Over twenty percent of the community college population enroll in academic courses to improve basic skills, to acquire general knowledge, or for personal development and pleasure. A large percentage of the students also take courses to improve their job skills or increase their employment potential (National Center for Education Statistics, 1984). These students are eligible for financial aid provided they are enrolled in accredited academic or vocational courses. None of the two-year studies included in the meta-analysis controlled for the students' educational objectives.

Another possible explanation for the decrease in the effect of financial aid on two-year graduation is that two-year college students receiving federal financial aid may be more prone to transfer to four-year institutions before graduating than students without financial aid. Federal financial aid provides more security and incentive to transfer since a student is eligible for aid whether attending a two- or four-year institution.

When two-year college studies were weighted, the average effect size did show an increase from +.1892 for studies measuring less than graduation persistence to +.2527 for studies measuring graduation persistence. Therefore, when making references to the effect of financial aid on two-year college graduation persistence, it should be kept in mind that even though the average effect sizes were statistically significant there was a very limited number of two-year studies available for analysis. Financial aid appears to affect positively both the persistence and graduation of two-year students more than four-year students. However, the relationship between the increased effect of financial aid from one year to graduation in two years is uncertain.

3. ***Financial aid appears to have a stronger effect on the persistence of private institution students than public institution students.***

The meta-analysis revealed that the effect of financial aid on private institution students was .08 (unweighted) and .21 (weighted) higher than the total sample, which consisted of predominately public two- and four-year institutions. A rational explanation for the larger effect size is that the higher cost of private institutions may force students without financial aid to transfer, dropout, or stopout at a greater rate than students receiving financial aid. Private institution students also receive a larger dollar amount of financial aid because the needs analysis formula adjusts for the level of college costs. Previous meta-analytic research has revealed that the dollar amount received has a positive effect on persistence (Murdock, 1986).

Some private institution studies (Yuker et al., 1972; Sheddan, 1976; and Flynn, 1980) show that a greater percentage of financial aid persisters also received institutional grants, scholarships, or loans than did financial aid nonpersisters. Yuker hypothesized that institutional money promoted retention more than federal financial aid because transferring students would lose the institutional money while still maintaining federal aid eligibility. Institutional money may have helped to meet more of the student's needs and, thus, decrease financial reasons for transferring or dropping out.

4. ***Financial aid has a stronger effect on persistence during the latter years of college than on the freshman year, particular so in terms of graduation probability.***

Meta-analysis II revealed a positive relationship between the length of persistence measured and the effect of financial aid. Although all effect sizes, unweighted and weighted, could be classified as having a less than small effect, studies measuring persistence in terms of graduation showed a slightly larger average effect size than studies using a shorter persistence specification, usually one and one-half years or less.

The findings of the meta-analysis are not surprising. Persistence literature consistently reports that the highest rate of attrition occurs in the freshman year. Whether a student receives financial aid is only one of numerous variables operating on freshman persistence. Academic ability, maturity, social adjustment, institutional "fit," degree of committment, and educational objectives are some of the other variables researchers have found to have as great or greater impact on freshmen retention than financial aid. As a student progresses up the educational ladder, more time and money are invested, which increases their committment to degree completion. Further, maturity counters the effect of many variables that may influence the young freshman. The accumulated monetary investment and the increased cost of education make financial aid more of a determinant in the decision to remain in college because for many students other factors have been eliminated--to some extent, simply through the dropout process. Families diminish their support after the student's freshman year and students become more dependent on other sources to finance their education (Leslie, 1984). Hence, it is not surprising that financial aid has a greater impact on student persistence in the latter years of college than the freshman year.

Many studies included in the meta-analysis found no statistical significant difference between freshmen recipient and nonrecipient persistence. The Astin and Cross (1979) study provides an excellent example of the influence of nonfinancial aid variables on freshmen persistence: examining over sixty financial aid and nonfinancial aid predictor variables, they found twenty-four variables to be significant predictors of student persistence and receiving financial aid was not among the significant variables.

5. ***Whether a study treats transfers as persisters or dropouts and whether a study includes part-time students in the sample are potential mediators of effect size.***

The meta-analysis showed studies that treated transfers as persisters had a higher average effect size than studies that treated them as dropouts. Although the dollar amount may vary, students receiving federal financial aid usually continue to be eligible for federal assistance when they transfer to other two- or four-year institutions. Therefore, one possible explanation for the difference in effect sizes may be that students receiving federal financial aid may be more likely to transfer than students not receiving aid.

Transfer students compose an average of 15.5 percent of the two- and four-year institutions student population (National Center for Education Statistics, 1982). In general, studies treating transfers as persisters will show a higher persistence percentage than studies that treat them as dropouts. If financial aid recipients are more likely to transfer than are nonrecipients, then financial aid will show a larger effect size.

The meta-analysis showed studies that included part-time students had a lower average effect size than studies that measured only full-time student persistence. This finding implies that financial aid has a greater effect on full-time students than part-time students. Of course, part-time students are considerably less likely to be eligible for aid. Further, they receive smaller aid awards. More than likely, the difference in effect sizes reflects the lesser amount of financial aid received by part-time students in relation to their needs.

The majority of part-time students are married or divorced, are over the age of twenty-five, female, commuters, and employed full-time. The average full-time student is single, under the age of twenty-five, lives on campus, and does not work or works less than ten hours a week (Carnegie Foundation for the Advancement of Teaching, 1986). Because part-time students often pay more for transportation, rent, and childcare, their educational expenses

average $2,000 more a year than full-time students (*The Chronicle of Higher Education,* April 23, 1986, p. 13). The aid formulas, however, are based on the average full-time student's needs. As a result, the full-time student living on campus can claim the total cost of room and board while the part-time commuter may claim only $1,600 a year in rent and food expenses. In addition, the aid formulas do not take into account such costs as child care while a student attends classes. Including the previous and current year's employment earnings in the needs analysis also lessens the amount of aid for which a part-time student is eligible. Since financial aid meets less of the needs of a part-time student than a full-time student, part-time students may be forced to stopout or temporarily discontinue their education; hence, financial aid would not show as strong an effect on their persistence as for full-time students.

A recent survey by The Carnegie Foundation for the Advancement of Teaching (1986) found that part-time students had a greater tendency to stopout than full-time students. The study also found that a greater percentage of part-time students, compared to full-time students, came from low SES families; fewer part-time students than full-time students evaluated their financial aid as "adequate;" and, part-time students composed 64 percent of two-year college enrollments and 23 percent of four-year institution enrollments. The Carnegie Foundation declared part-time students to be one of the fastest growing groups of students in the United States and predicted that two-year institutions would continue to attract the lion's share of part-time students.

6. ***There are numerous potential mediators of the effect of financial aid on persistence.***

As noted, studies that control for academic ability will most likely show very little difference between persistence of recipients and nonrecipients. Studies examining graduation will most likely show financial aid to have a stronger effect than studies examining persistence

of two or less years. Studies investigating the impact of financial aid on private and two-year college students will most likely exhibit larger effect sizes than studies focusing on students in four-year institutions. It also appears that the varying treatment of transfers and stopouts and student enrollment status may influence consistency in study results.

It is hoped that the meta-analysis will encourage researchers to further examine the variables that may moderate the effect of financial aid on persistence. If researchers want to gain a more accurate measure of financial aid effect on persistence, an attempt should be made to include part-time students, transfers and stopouts in the study population. These three groups compose a large percentage of the total student population and the manner in which a study treats their persistence mediates the effect size. In order to adopt this recommendation, studies will have to measure persistence over a longer period of time than just one semester, one year, or even two years. Only in this manner will the true effect of financial aid on the total student population be determined.

When studies controlled for academic ability (Meta-analysis IV), the average effect sizes showed a small negative value and the unweighted effect size neared zero. The results were interpreted to mean that financial aid had the effects of removing economic barriers, decreasing the probability of dropping out for financial reasons, and enabling the lower-income student to persist at a level almost equal to that of middle- and upper-income students. Summerskill's (1962) review found that when academic ability was held constant, differences in dropout rates between high and low SES students disappeared. Since financial aid was not a variable analyzed by the studies in the Summerskill review, two interrelated questions arise: What is the relationship among academic ability, socioeconomic status, and financial aid? Does financial aid perhaps make a stronger contribution to the objective of access for the low SES student than it does to persistence?

Past studies (National Center for Education Statistics, 1978, 1984) indicate that financial aid recipients of low, middle, and high academic ability persist at a higher rate than their comparative nonrecipient groups; financial aid recipients of low, middle, and upper socioeconomic status persist longer than their comparative nonrecipient groups. However, low ability recipient students persist at a lesser rate than middle and high ability nonrecipient students; and, low SES recipient students persist at a rate only slightly above that of middle SES nonrecipients and at a lesser rate than high SES nonrecipient students.

In order to resolve the issue surrounding the relationship among academic ability, SES, and financial aid, studies that control for both academic ability and socioeconomic status need to be conducted. Since financial aid was found to have a larger impact on two-year college students than four-year college students, it would be advisable for researchers to differentiate between the two types of students. Particularly in two-year institutions, studies should control for the educational intentions of the student sample, i. e., non-degree seekers probably should not be included in graduation persistence studies.

In addition, financial aid is argued to remove economic barriers to achieve three major objectives: access, choice, and persistence. For comparative purposes, the results of access studies need to be synthesized in order to measure the total impact of financial aid on low SES students. Students must gain access to an institution before they can persist and most likely financial aid is a more important equalizer during the entry phase than it is during the exit phase.

This meta-analysis relied on ad hoc statistical methods to assess the influence of variations in experimental conditions. As a result, the series of univariate analyses did not reveal the potential interaction among the variables or provide a precise measurement of variable effect.

Future meta-analyses should consider the use of regression models designed to explain variations in effect magnitude as a function of experimental conditions.

In conclusion, although student aid is not the only variable that effects student attrition,--indeed, it is not even the major one--the results of the meta-analysis identifies financial aid as a viable tool for assisting students to remain in college. Assuming that financial aid is targeted on low-income students, the meta-analysis showed financial aid to assist those student to persist at a rate equal to or above middle and upper income students. Equal educational policy recommendations derived from the meta-analysis suggest that financial aid funding should keep pace with inflation and higher educational costs; more of an effort should be made to meet the students' financial needs; and, institutional, state, and federal financial aid policy must address the changing demography of American higher education by acknowledging the growing presence of the nontraditional student. In addition, institutional preventive dropout programs should incorporate academic, nonacademic, as well as financial measures for full-time and part-time students. Financial aid is only one of many variables affecting retention and if equal educational opportunity is to be fully achieved, all variables must receive equal attention.

Appendix

Studies included in Meta-analysis

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